SANTA CLARA VALLEY WATER DISTRICT

ALAMITOS FISH LADDER
MONITORING REPORT
2005-2006

Project No. 62742011

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I. PROJECT BACKROUND

The Alamitos Fishway is located on the Guadalupe River approximately 20 miles from South San Francisco Bay downstream of Lake Almaden, Guadalupe Creek, and Alamitos Creek. The Alamitos Fishway was completed in November, 1999. The Masson Fishway, located approximately two miles upstream of the Alamitos Fishway on Guadalupe Creek was completed in October, 2000. In the Final Mitigated Negative Declaration for the Masson Fishway, dated February 1999, it was agreed that the Masson and Alamitos Fishways be monitored for five years post-construction to assess the effectiveness of fish passage through both facilities.

Due to regulatory constraints imposed in 1997 when steelhead (*Oncorhynchus mykiss*) were federally listed as Threatened in Santa Clara County under the Endangered Species Act, restricted the direct handling of these fish, and therefore, it was necessary to find a means of passively enumerating fish passage through the new ladder. District fisheries staff determined that a non-invasive fish counting device placed in the fishway would satisfy both the monitoring commitment for the Fishway and the concerns of the Regulatory Agencies. The equipment chosen to accomplish the task was the Vaki Riverwatcher (RW), a computer based fish counter which employs scanner plates and a digital camera to capture digital photos and silhouette images of fishes as they pass between the plates. The RW provides information on the occurrence and timing of fish migration both upstream and downstream.

This report documents the 3rd year of fish passage data collected at the Alamitos Fishway for the 2005-2006 season.

II. METHODS

September 1, 2005 marked the start of the third year of operation for the RW system in the Alamitos Fishway. Installation and functionality of the RW did not change from the previous year’s operation.
In 2003, District staff designed and manufactured a housing which enabled the counting device to fit directly into one of the existing Fishway panels. The counter itself is a rectangular shaped unit which is completely submerged within one of the pools in the Fishway. Fish are directed through the counter opening which is lined with infrared light emitting diodes. When a fish swims through the counter and breaks the plane of light beams, the fish is scanned and a resulting silhouette image is sent to the on-site computer. Other information recorded as the fish passes includes: the speed the fish was traveling, the direction the fish was moving (upstream vs. downstream), the body depth of the passing fish (for depth to length ratios), along with the date and time. Fish moving in the upstream direction trigger an underwater black and white video camera which takes up to 5 digital photos of each fish. This enables the user to scan through the images to confirm the presence of a fish and potentially identify the species. All of the data collected by the RW is stored by the attached on-site computer which is powered by six deep cycle 6-Volt batteries that are continually recharged by two 165 watt solar panels.

The counter was maintained daily during the typical storm season (November – February) and bi-weekly thereafter until the ladder was decommissioned for the season on June 1, 2006. Typical maintenance included clearing debris build up from the counter, downloading data from the database, and resetting the system. On June 1, 2006, the Alamitos ladder was decommissioned for the season.

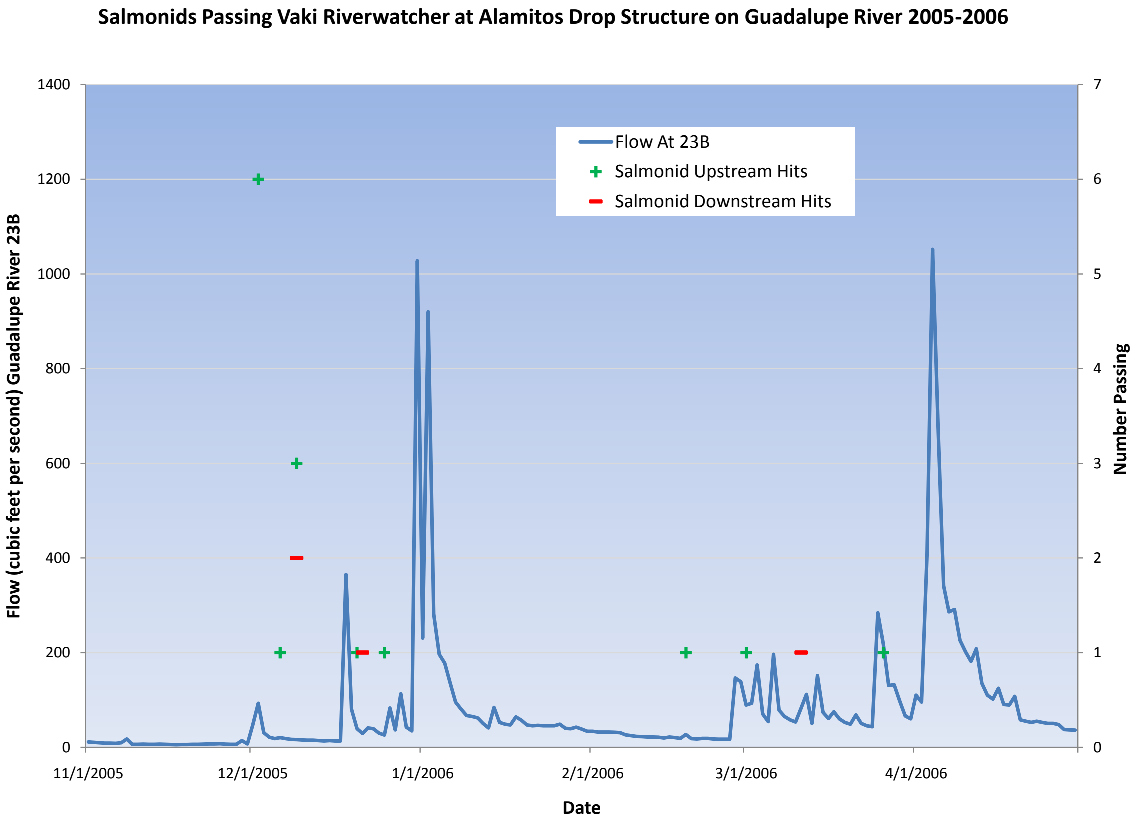
III. RESULTS

From September 1, 2005 through June 1, 2006, various fish species utilized the ladder and moved through the RW device. Images produced by the RW were not clear enough for District staff to differentiate between fall-run Chinook salmon (*O. tshawytscha*) and steelhead/rainbow trout. Therefore, both species were lumped together and designated as 'salmonids.' Salmonids were documented using the ladder only during the months of December 2005, February 2006, and March 2006. Due to the spatial timing of salmonid "hits" on the RW system, it is reasonable to conclude that salmonids recorded in December were Chinook salmon and salmonids recorded in February and March were steelhead/rainbow trout. In addition to spatial timing, fish length can also be an indicator of fish species. Salmonids in December ranged in estimated fork length from 62 to 86 centimeters. Salmonids in February and March ranged in estimated fork length from 39 to 59 centimeters. While size alone is not an absolute measure of species identification, combined with spatial timing, it is reasonable to conclude based partially on relative size that salmonids recorded in December were Chinook salmon and salmonids recorded in February and March were steelhead/rainbow trout since Chinook salmon are "typically" larger than steelhead/rainbow trout. Salmonid movement data recorded by the RW is summarized below in Table 1 and sorted by date and time.

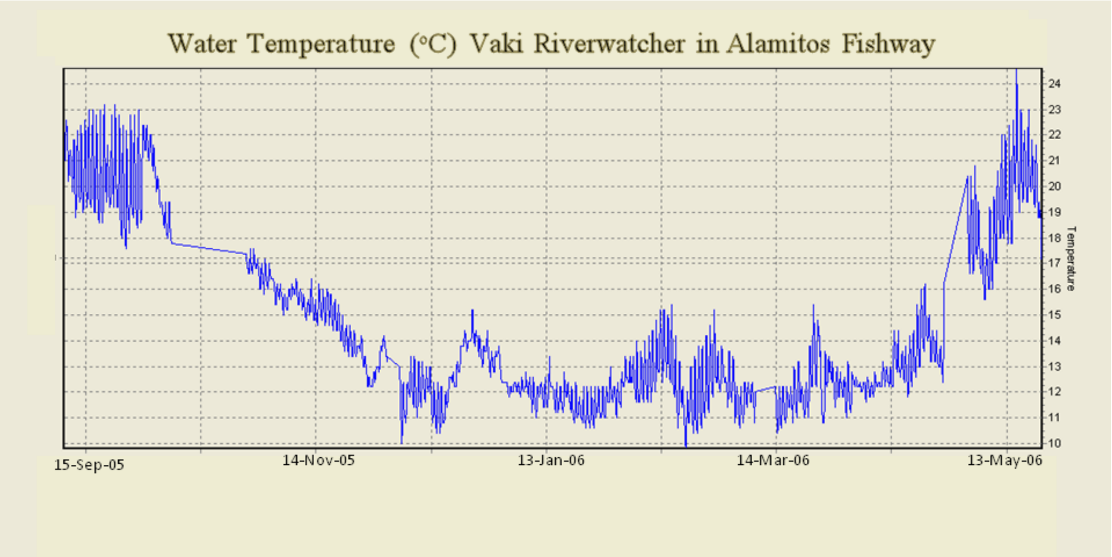
Table 1. Passage of Salmonids Through Alamitos Fishway

Date/Time	Depth [mm]	Estimated Forklength [cm]	Direction
12/2/05 6:51	174	76	Up
12/2/05 9:11	149	65	Up
12/2/05 15:17	161	70	Up
12/2/05 19:30	143	62	Up
12/2/05 19:38	197	86	Up
12/2/05 19:38	145	63	Up
12/6/05 21:15	176	77	Up
12/9/05 1:56	180	79	Up
12/20/05 9:39	166	73	Up
12/21/05 19:37	169	74	Down
12/25/05 2:09	161	70	Up
2/18/06 5:10	105	46	Up
3/1/06 3:19	108	47	Up
3/11/06 7:23	135	59	Down
3/26/06 20:54	90	39	Up

In addition to salmonids, fish species confirmed using the ladder included common carp (*Cyprinus carpio*), largemouth bass (*Micropterus salmoides*), and Sacramento suckers (*Catostomus occidentalis*).



Temperature data in the fish ladder was automatically collected every three hours by the RW (Figure 7). Temperatures ranged from 20°C in September and dropping below 14°C by late November. Temperatures then varied between 10-15°C through late April. Temperatures increased in May, reaching temperatures exceeding 20°C by June. During the period of salmonid migration through the RW (December-April), temperatures ranged between 10-15°C. Temperature trends were similar to past years monitoring.

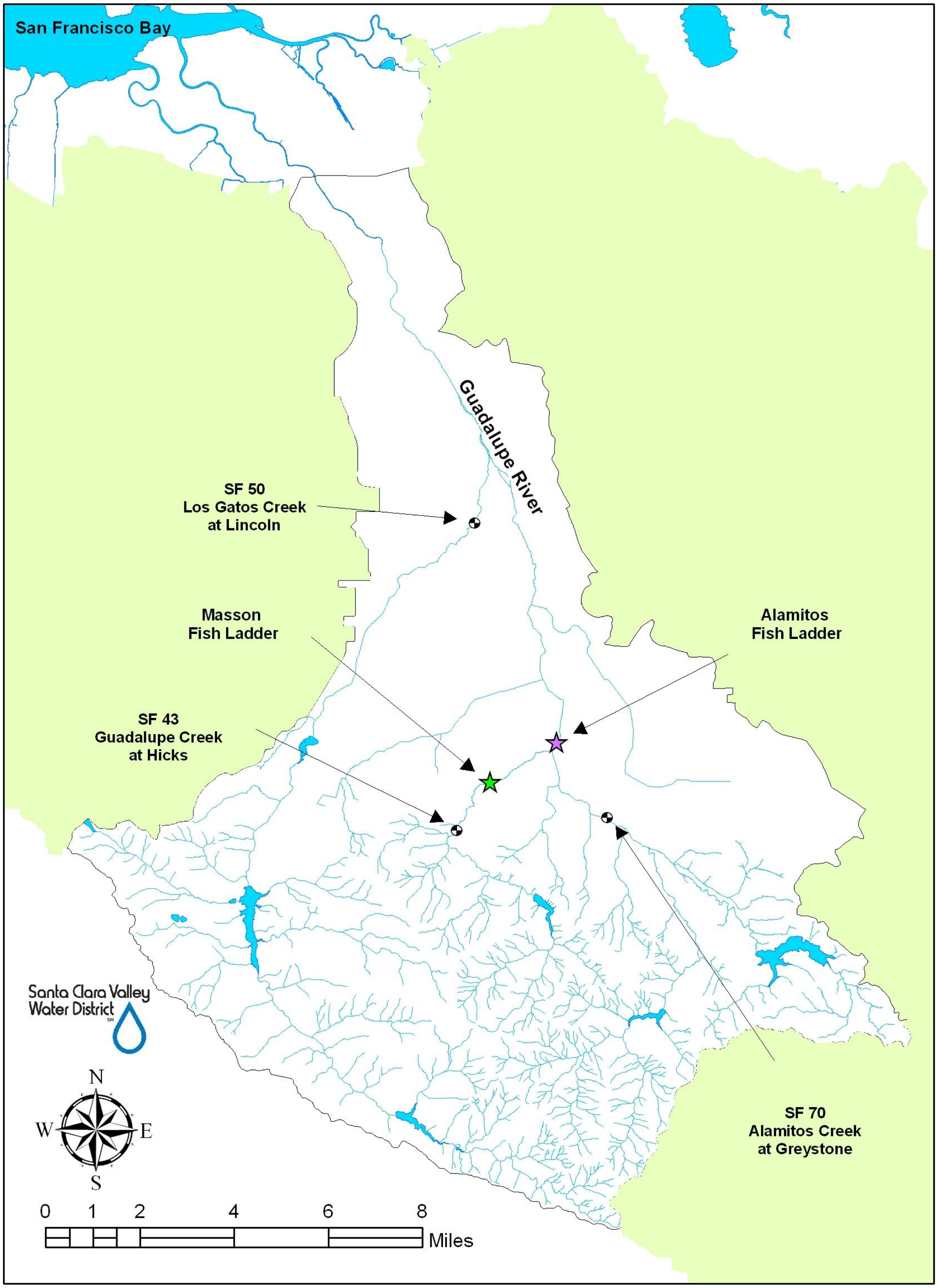


IV. DISCUSSION

Similar to the first two years of operation, the RW continued to have some difficulties. These difficulties were primarily due to relatively high turbidity and the camera’s limitations to clearly photograph passing fish. The inability to successfully photograph most fish makes it difficult to determine all of the fish species utilizing the ladder. However, enough data was collected in 2005-06 along with the past monitoring data from 2003-04 and 2004-05 to conclude that the Alamitos Fishway affords fish passage where none existed prior to 1999. Table 2 summarizes the number of salmonids which utilized the fishway from 2003-2006. The RW will be moved and remain at the Masson Ladder site for at least the 2006-07 and 2007-08 monitoring season to assess that facility’s ability to pass fish. Turbidity levels are typically lower at the Masson site in Guadalupe Creek than those at the Alamitos site. Given relatively clearer water conditions at the Masson site, the RW is expected better document passing fish at this facility.

Table 2. Summary of Salmonids Documented Passing Alamitos Fishway

Monitoring Year	Up	Down
2003-2004	22	4
2004-2005	28	12
2005-2006	15	4


San Francisco Bay
Guadalupe River
SF 50
Los Gatos Creek
at Lincoln
Masson
Fish Ladder
Alamitos
Fish Ladder
SF 43
Guadalupe Creek
at Hicks
SF 70
Alamitos Creek
at Greystone
Santa Clara Valley
Water District
N
W
E
S
0
1
2
4
6
8
Miles